

PATELLA VULGATA, LINNÆUS, AND ITS SO-CALLED VARIETY,
PATELLA DEPRESSA, PENNANT.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 12th January, 1917.

PENNANT, *British Zoology*, vol. iv, 8vo ed., 1777, p. 142, described his *Patolla depressa* as a "shell much depressed, the vertex approximating nearly to one edge. More oblong than the former" [*vulgata*].

Forbes & Hanley, *Hist. British Mollusca*, vol. ii, p. 428, under the name *athletica*, Bean, regard *depressa* on conchological grounds as a true species, but, after mentioning that the two forms "inhabit different levels, the *vulgata* being always in the higher zone", add the singular statement, "We have sought in vain for differences between the structure of the tongue in this and the common species."

Jeffreys, *Brit. Conch.*, vol. iii, p. 237, regards *depressa*, Penn., as a var. of *vulgata*, and "cannot find a single permanent character which will serve to distinguish" them or the var. *intermedia*, Knapp.

The authors of the List of British Marine Mollusca published by the Conchological Society (*Journ. Conch.*, vol. x, 1901, p. 16) appear to have been of the same opinion, since they kept *depressa* as one of the vars. of *vulgata*, but in their revised edition (1902) they treat them as separate species.

If the radula of a specimen of *vulgata*, the shell of which measures 2 inches in length, be laid out alongside the radula of a specimen of *depressa*, whose shell is also 2 inches long, it will at once be noticed that the radula of *depressa* is markedly shorter than that of *vulgata*, probably by as much as $\frac{1}{2}$ to $\frac{3}{4}$ inch. Two other points will strike the observer: the radula of *depressa* is much broader than that of *vulgata*, and the nascent portion is relatively much shorter and terminates more abruptly. Thus a radula of *vulgata* measuring 84.2 mm. long is .8 mm. broad, with perhaps 25 nascent and 190 adult rows, while a radula of *depressa* 55.6 mm. long is 1.6 mm. broad, and has 6-7 nascent and 112 adult rows.

If a long series of the two forms be taken, and the radulæ of shells of equal length, from the same locality, examined, this difference becomes more striking. Beginning with shells measuring 58.8 mm. (the largest procurable of both species) and forming a series with shells decreasing each time by an equal amount (1.6 mm.), we find that in every case the radula of *depressa* is markedly shorter than that of *vulgata*. Sometimes the amount of difference is so large as to be startling; thus in the case of shells measuring 55.6 mm. the radula of *vulgata* is 89 mm. long, that of *depressa* 47.8 mm., a difference of 41.2 mm., or more than $1\frac{1}{2}$ inches. In the case of shells measuring 44.6 mm. the radula of *vulgata* (100.2 mm.) is more than double the length of that of *depressa* (44.6 mm.). In the younger specimens the difference is just as marked. And if the length of the radulæ of the whole series is added up, the average length of a *vulgata* radula is found to be 63.6 mm., while that of

a *depressa* radula is 37·4 mm. The sum of the whole of the differences in length in favour of *vulgata* is, in the twenty-nine specimens of the series, 75·96 cm., or about 2½ feet.

Length of shell. ¹	Length of radula in		Difference in
	<i>vulgata</i> .	<i>depressa</i> .	favour of <i>vulgata</i> .
58·8	84·2	70·0	14·2
57·2	87·4	65·2	22·2
55·6	89·0	47·8	41·2
54·0	81·0	46·2	34·8
52·4	76·2	57·2	19·0
50·8	87·4	49·3	38·1
49·3	76·2	46·2	30·0
47·8	74·8	50·8	24·0
46·2	74·8	54·0	20·8
44·6	100·2	44·6	55·6
43·0	87·4	38·2	49·2
41·4	84·2	43·0	41·2
39·8	87·4	36·6	50·8
38·2	87·4	36·6	50·8
36·6	54·0	36·6	17·4
35·0	66·8	33·4	33·4
33·4	60·4	35·0	25·4
31·8	47·8	35·0	12·8
30·2	76·2	33·4	42·8
28·6	46·2	28·6	17·6
27·0	43·0	27·0	16·0
25·4	38·2	27·0	11·2
23·9	41·4	27·0	14·4
22·4	36·6	25·4	11·2
20·8	38·2	22·2	16·0
19·2	38·2	19·2	19·0
17·6	28·6	19·2	9·4
16·0	23·9	17·6	6·3
14·4	27·0	14·2	14·8

It must be remembered that the specimens examined are not specially selected in order to exhibit differences of length in the radula. They are simply, in each case, the first two specimens of equal length which happened to come to hand on a certain beach in South Devon.

In the teeth of the radulae themselves certain small differences appear. In both cases there are four uncini flanked on each side by laterals, the innermost of which is armed, and not in the same plane with the rest. In *depressa* the two interior uncini are much narrower than the two external, the hooks being mounted on narrower bases than in *vulgata*. This fact, which is observable in the nascent rows, becomes more marked as growth proceeds. In *vulgata*, on the other hand, the two interior uncini, although smaller than the other two, are not nearly so unequal to them in breadth. Further, the serrations of the interior lateral appear to be much more deeply cut in *vulgata* than in *depressa*.

The sum of all these observations seems to tend decisively to the conclusion that in *vulgata* and *depressa* we have two quite distinct species of British limpets. It is my impression, which I have not yet had time to verify, that *vulgata* is a northern, *depressa* a southern

¹ Measurements are in millimetres.

form, and that while the northern limit of the distribution of *vulgata* is about the latitude of the Lofoden Islands, that of *depressa* is very much further south.

It should be made clear that the statement of Forbes & Hanley—the two forms “inhabit different levels, the *vulgata* being always in the higher zone”—does not represent the facts accurately. *P. vulgata*, as is well known, lives from near high-water mark to the extreme of low-water. *P. depressa*, on the other hand, is seldom found till near low-water mark, where, so far as my experience goes, *vulgata* and *depressa* occur abundantly on the same masses of rock. This fact further strengthens the case for their specific difference.

* * * Since the foregoing paper was read, our Editor informs me that it is stated in Woodward's *Manual*, 1st ed., p. 451, that “Mr. Wilton has ascertained that *Patella athletica* may be distinguished from the common limpet of our coast by its teeth”. He further tells me that in his uncle's interleaved working copy of the *Manual*, now in his possession, he finds the following manuscript note: “*Patella athletica*: dental canal not much longer than the shell (scarcely half as long as in *P. vulgata*): teeth closer together than in *P. vulgata*; more massive and with shorter cusps; the difference is greater in the imperfectly developed teeth near the further extremity of the canal.”
